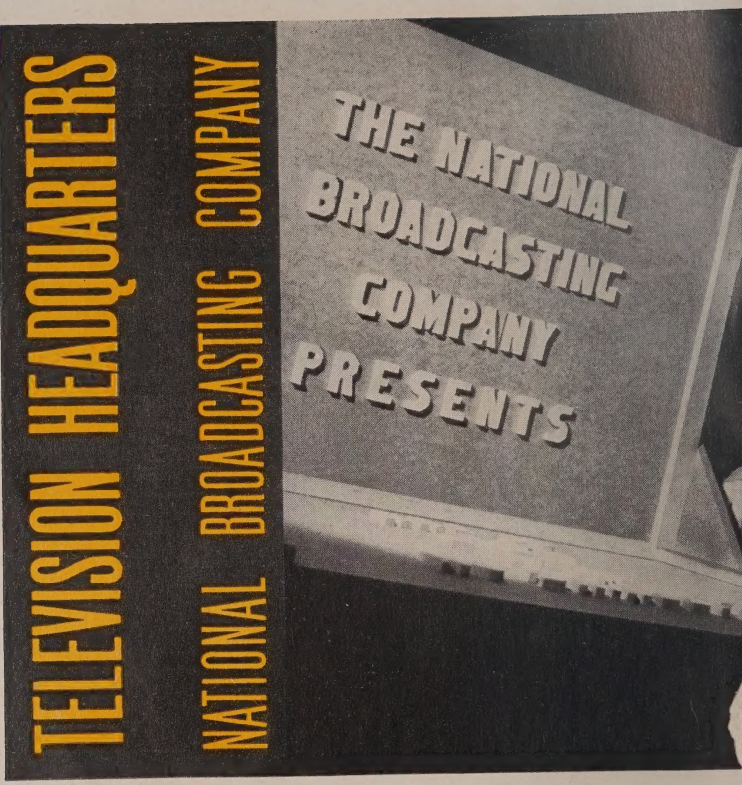
TELEVISION



"The ultimate contribution of televisi
will be its service towards unification
the life of the nation and, at the sa
time, the greater development of the l
of the individual. We who have labor
in the creation of this promising n
instrumentality are proud to launch
upon its way . . ."

— DAVID SARNOFF
President, Radio Corporation
America and Chairman of the Boa
National Broadcasting Compa

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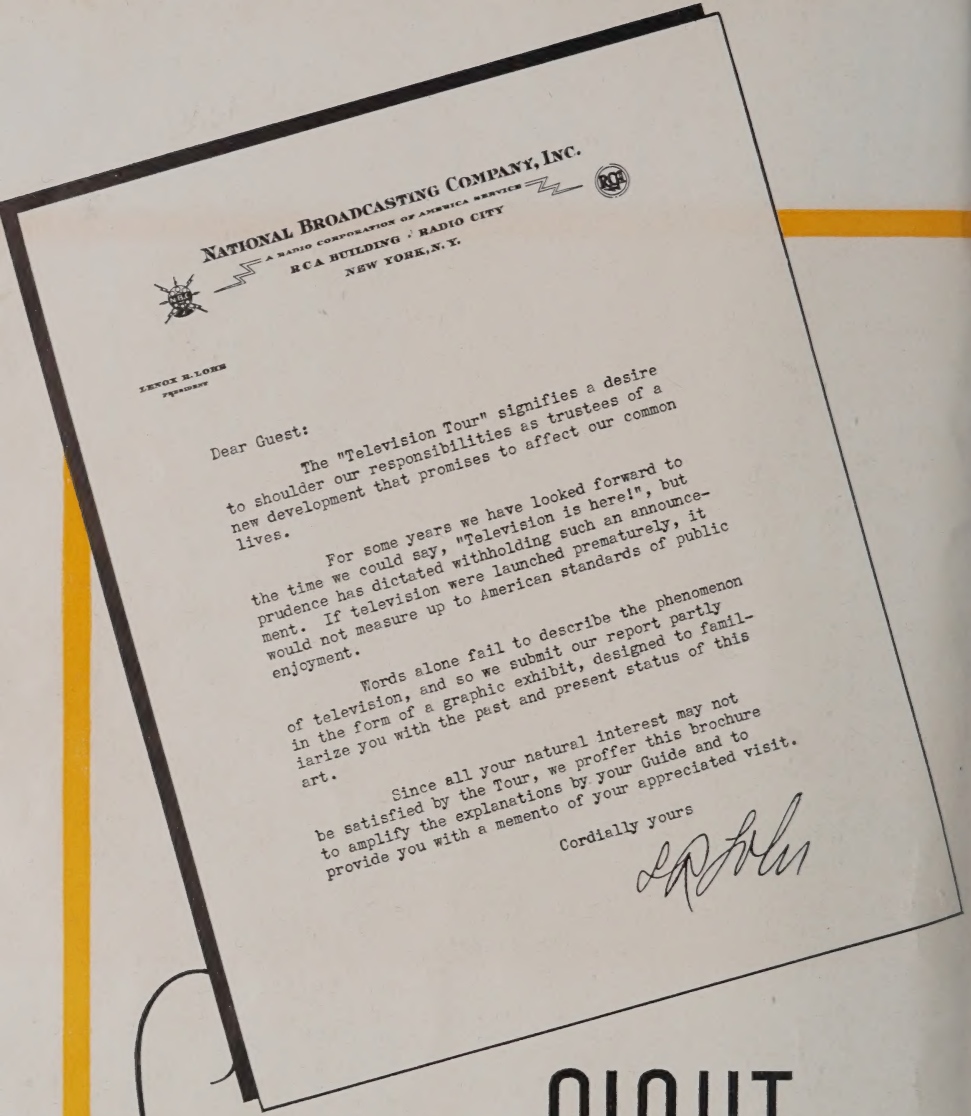
MERICA'S FIRST

TELEVISION TOUR

DEMONSTRATING · DESCRIBING THE ART AND SCIENCE OF

SEEING AT A DISTANCE



NATIONAL BROADCASTING COMPANY, INC.
A RADIO CORPORATION OF AMERICA SERVICE
RCA BUILDING / RADIO CITY
NEW YORK, N. Y.

LENOX R. LOHR
PRESIDENT

Dear Guest:

The "Television Tour" signifies a desire to shoulder our responsibilities as trustees of a new development that promises to affect our common lives.

For some years we have looked forward to the time we could say, "Television is here!", but prudence has dictated withholding such an announcement. If television were launched prematurely, it would not measure up to American standards of public enjoyment.

Words alone fail to describe the phenomenon of television, and so we submit our report partly in the form of a graphic exhibit, designed to familiarize you with the past and present status of this art.

Since all your natural interest may not be satisfied by the Tour, we proffer this brochure to amplify the explanations by your Guide and to provide you with a memento of your appreciated visit.

Cordially yours

Let there be SIGHT

For innumerable years men have wanted perfect communication. The notion that scientists conceived television, the most perfect communication, in hidden laboratories and gave it to the world as the offspring of technical research differs, therefore, from our best understanding. In truth, the longing to see afar is a primitive instinct in man and preceded the so-called scientific age.

Ancient legends and traditions hint of television. History, literature, and art frequently allude to men with the enviable gift of far-sighted-

ness. The visionaries — star-gazers, oracles, poets, and prophets — gave solace to human aspiration by conjuring up pictures in space. Such revery may be considered the forerunner of television for it gave direction to those who wanted to improve the existing means of transmitting information; and their goal was looking and listening at a distance.

At best the ancients could merely signal at a distance. The American Indian communicated simple ideas with smoke; other peoples signaled with flashing lights and waving flags and booming drums.

For ever so many years men pitted brawn against time and space. The inadequacy of muscular communication was proved in many minor and important events.

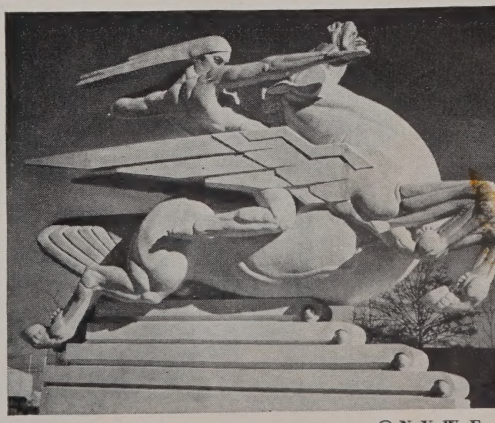
A swinging lantern in the old North Church spire started Paul Revere on his ride through the countryside, but many patriots failed to glimpse the rider's shadow or hear his warning. The Concord "shot heard 'round the world" traveled for months before it reached the other side of the planet.

News of Abraham Lincoln's assassination reached England more than one week after Booth fired his fatal shot. Andrew Jackson fought and defeated the British in the Battle of New Orleans two weeks after peace had been signed at Ghent, Belgium. A thousand ships vanished, a million lives perished, and countless hopes failed because communication was imperfect.

Ships, trains, automobile, aircraft — they differ only in degree. For its expansion, civilization needed absolute annihilation of time and space, and from such necessity radio came. At first it spoke only in monotone dots and dashes. Then it acquired tone color and so made it possible to hear voices and music.

Despite lightning speed, sound radio falls short of perfection because it appeals to only one of our five senses. Today's television unites sight and sound broadcasting and brings communication vastly nearer to perfection. We now see each other afar, eye to eye—man to man.

Typifying modern communication, this sculpture by Joseph Renier titled "Speed," dominates the Court of Communications at the New York World's Fair 1939.



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On the Television TOUR

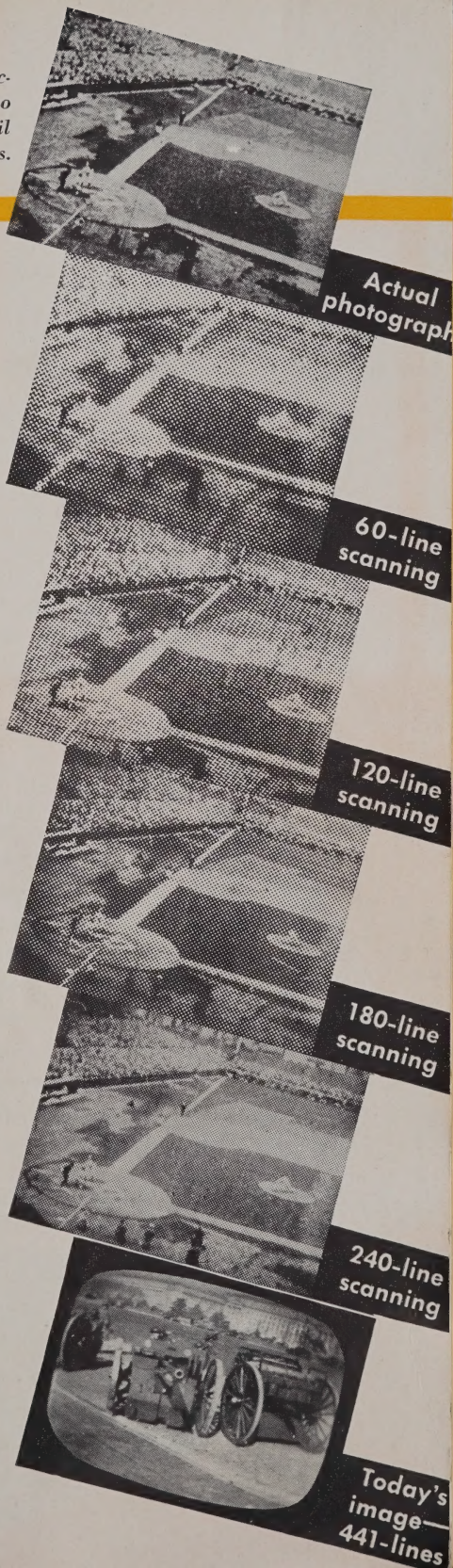
You saw exhibits that traced television from its infancy up to the present. For your convenient reference we hereinafter review the salient points covered in the Tour:

With his imagination and his mind's eye man roved the universe, and he "saw" through fog and night, earth and substance.

But the specific inventions and discoveries that relate directly to television go back only to the year 1817 when Baron Jöns Jacob Berzelius, a Swedish pharmacist, discovered a strange element which he named selenium. A scientific oddity of that day, relatively little was heard of it until 56 years later, in 1873, when May, a telegrapher working

Plan of the NBC Television Tour.

Four Kinescope image pictures of a "still" photo showing improved detail since early experiments.



at the Valentia Trans-Atlantic Cable Station, in Southwestern Ireland, observed that a resistor made of selenium transmitted current better when the sun shone upon it. Other experimenters confirmed the fact that light causes selenium to transmit electricity better than when it is immersed in darkness.

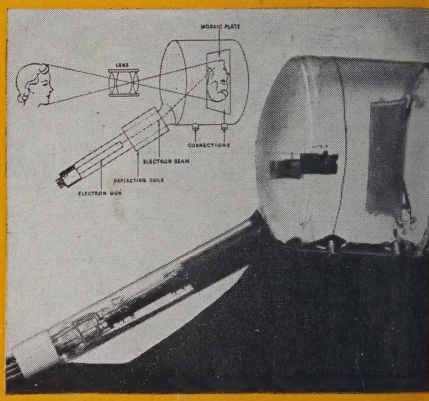
May's discovery foreshadowed the modern photoelectric cell, a device designed to convert light variations into equivalent electrical impulses; this photo-cell principle is the crux of RCA's all-electronic system of television.

(UPPER) *Natural photograph of young woman appearing on screen below.*
(LOWER) *Television image picture as it appears on the home receiver in 441 lines.*

Guide describing receiver used with outmoded mechanical scanning system.

Or

Televisio



Iconoscope, the "electric eye" of the television camera. Diagram shows how lens focuses image on mosaic plate.

Although we ordinarily think of television as a 20th century development, its basic principles were known and demonstrated in the 1880's! Silhouettes and crude outlines were televised, transmitted over wires for short distances, and finally reproduced. Of course, the images did not compare with the 441-line standard of today.

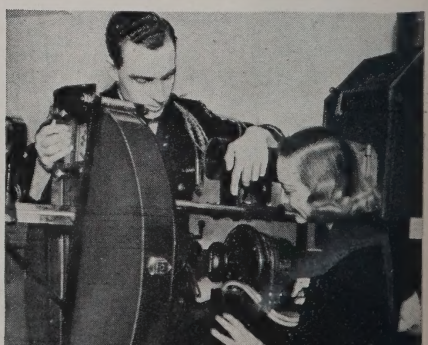
For several decades thereafter, television was rather dormant. People generally regarded it as an interesting laboratory oddity, but doubted whether it could ever be perfected.

One factor which seriously hindered early progress was the lack of a satisfactory medium for transmitting a program from the camera to the receiver. But in the period of the World War, 1914-1918, radio developed a new stride. Spurred by necessity, engineers greatly improved transmitting and receiving equipment and studied the peculiar nature of radio waves. Within a few brief years radio entered the home, and the old crystal sets gave way to modern vacuum tube receivers.

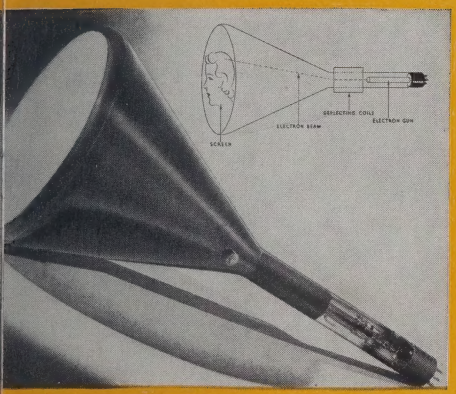
In the pioneer days of sound broad-

Outmoded mechanical scanning camera. Subject sat before photoelectric cells.

Mechanical scanning camera used by Dr. E. F. Alexanderson about 1930.

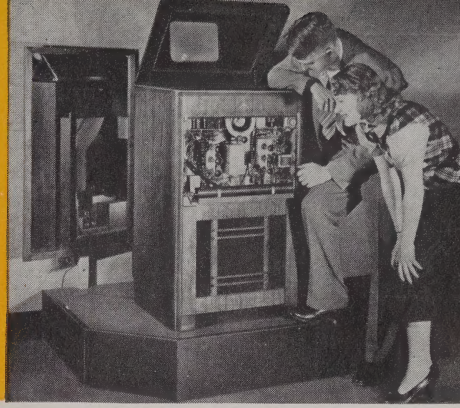


the TOUR



The Kinescope, corresponding to the "loud speaker" of an ordinary radio receiver. Diagram illustrates functioning.

casting it was discovered that crude action pictures could be sent through the air on radio waves. At once sensing the practical potentialities, experimenters attacked the television problem anew. NBC's parent company, the Radio Corporation of America, was among the first to enter this field.



RCA television receiver with front panel removed to show the interior.

At this stage of his discussion your Television Tour Guide called attention to a photoelectric cell, which made possible the first practical tests in television. The simplest of these tests employed a single photo-cell unit. From this the experimenters soon progressed to a unit with eight photoelectric cells.

The television subject stood before the battery of "eagle" eyes while a scanning machine swept a brilliant point of light across his face in a series of parallel lines. In far less time than it takes to tell, the light was reflected from the subject's face to the photo-cells, which converted it into pulsating electric currents. Conducted to a transmitter station, the weak currents were amplified, superimposed upon a radio carrier wave, and broadcast — like

Guide explaining diagram illustrating technical operation of television.

Close-up of receiver; Kinescope image is reflected onto mirror under lid.

the method in sound broadcasting.

Your Guide described the receiving equipment used in those early tests. He explained how, with the aid of a neon tube and a scanning disc, a radio signal was converted into visible light, thus reproducing the original studio action in a series of horizontal lines. The televiewers observed the program through a magnifying glass.

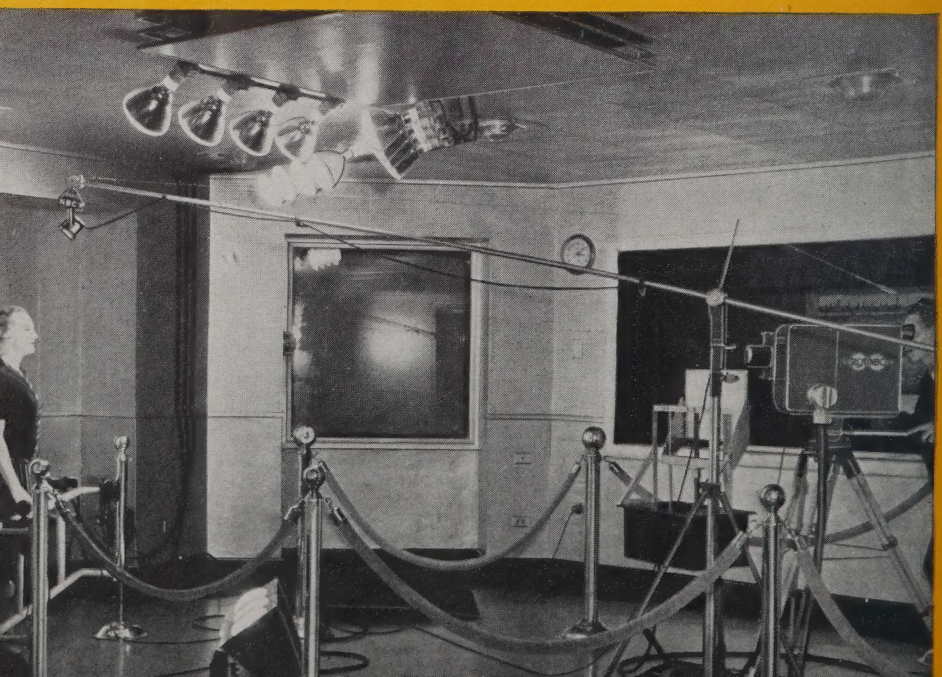
Your Guide demonstrated the original mechanical scanning projector used by Dr. E. F. Alexanderson, of the General Electric Company, Schenectady, about 1930. He dimmed the overhead light and turned on a "scanner" which projected a tiny spot of light upon a screen about 10 feet away. As the scanning disc rotated on its axis, you saw the spot traveling from left to right in a series of parallel arc lines. These lines — actually composed of spots — were reflected back to the electric eyes, which create the "television signal," subsequently amplified and broadcast.

Turning to the opposite wall, you saw Felix the Cat, who claims the distinction of being the world's first television artist. Mounted on a turn-table, he went 'round and 'round for many hours as the engineers carried on experiments.

Until a few years ago, the scanning function in the camera and receiver was accomplished mechanically. Then Dr. Vladimir Zworykin, now a scientist with RCA, perfected his system of electronic scanning, which revolutionized television and ushered in the present era.

The Iconoscope, the television ca-

Interior of the Tour television studio, showing how a guest is televised. The camera operator is at the extreme right. The microphone is suspended over the subject's head.



How the television subject sees the camera; part of lighting arrangement is overhead.

mera's eye, corresponds to the microphone in sound broadcasting. It is a vacuum tube enclosing a light-sensitive plate held in a fixed position behind the camera lens.

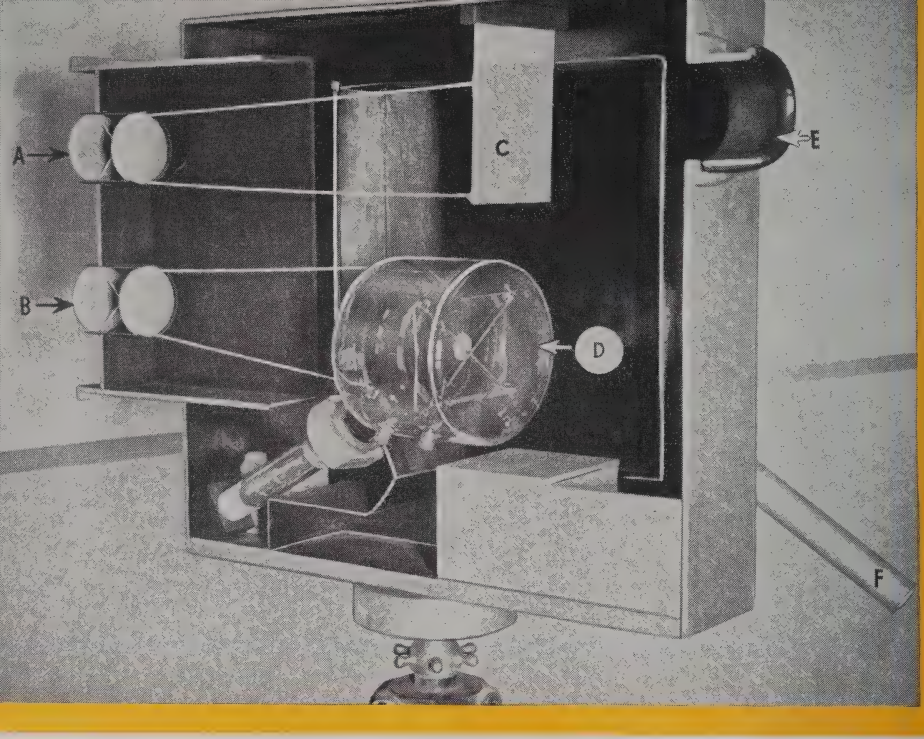
In certain respects, television may be compared with some familiar aspects of photography. We begin with a camera, lens, and light-sensitive plate; however, instead of our light-sensitive plate undergoing a chemical change, the corresponding plate in television generates faint electric currents that vary in direct ratio to the intensity of light falling upon it.

Television's "mosaic" plate measures 4 by 5 inches and consists of several hundred thousand infinitesimal light-sensitive globules, each insulated from the other. In all essentials the individual particles resemble ordinary photo cells. As light rays strike them, they become electrically-charged; the charges cling to the respective cells until removed by scanning.

Scanning is accomplished by a needle-point electron beam that sweeps across the plate exactly as our eyes follow lines of type on a printed page, that is, from left to right and top to bottom. The beam scans 441 horizontal lines on a given picture in about one-thirtieth of a second, and this same operation is repeated thirty times per second.

Actually, however, the scanning beam covers the plate *twice* in about one-thirtieth of a second. On its first coverage the beam scans the 220 odd lines in about one-sixtieth of a second, while on its second coverage it scans the 221 even lines, and completes the picture of 441 lines. This is called interlaced scanning.

The incredible speed of scanning is



Simplified cutaway model of television studio camera, indicating principal parts. A—Focusing lens for ground-glass. B—Lens which focuses image on Iconoscope plate. C—Ground glass. D—Iconoscope. E—Viewing aperture which permits operator to see the ground-glass image. F—Focusing handle.

a characteristic function of a system designed to transmit action pictures. If it were necessary to transmit only "stills," scanning speed could be reduced considerably. From left to right, the beam scans at the rate of two miles per second; on the return trace, right to left, it travels ten times faster, or at the rate of 20 miles per second.

The object of scanning is to facilitate the radio transmission of an action picture. When broken into narrow horizontal strips it can readily be converted into corresponding electrical impulses which are reassembled and reproduced visually at the receiving end.

The speed of radio waves which carry the television picture is comparable to the velocity of light, about 186,000 miles per second; no greater speed is known to exist in our universe.

The rather crude pictures in the early days of television consisted of 60 to 120 lines, but today NBC transmits much finer detail by dividing each picture into 441 lines. At close range you can see these lines on a Kinescope screen with your naked eye; but at normal viewing distance they are invisible.

Radio action pictures deceive our eyes in the same way moving pictures do. Twenty-four "still" pictures appear on a moving picture screen every second, and our persistence of vision allows us to see

nothing but smooth, continuous action. Television images are flickerless because interlaced scanning, described above, insures the smoothest possible movement.

Subsequently your Guide discussed the Kinescope, the image-reproducing vacuum tube of the home receiver; it consists of two main parts, an electron gun and a fluorescent screen on which pictures appear. These are reflected onto a mirror under the lid. When the home is equipped for television, a suitable antenna intercepts the broadcast "signal," which is tuned in by the receiver, amplified, and impressed on the Kinescope electron beam, which reproduces the picture on the fluorescent screen through the scanning process, described above.

The all-electronic system of television appears effectively to solve the problem of seeing at a distance. Progress in the past five years has been unprecedented, and it was climaxed in 1936 by the inauguration of a program service from NBC studios in Radio City. In months to come, NBC contemplates carrying this work to a stage of development that will warrant a daily program service to the public.

In the Viewing Room you saw late-model television receivers whose screens reproduced the images of people standing before a camera in an adjoining studio. The television receiver resembles the ordinary home radio console, but it really consists of two instruments inside one cabinet—one capable of reproducing sound, and the other of reproducing pictures.

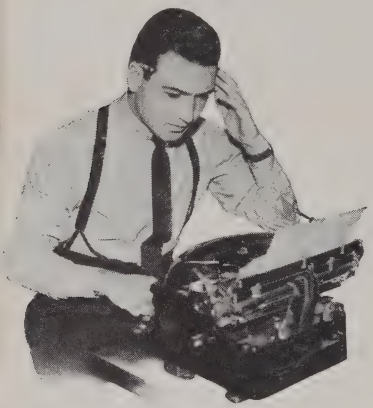
The heart of the instrument is the Kinescope, the large end of which comprises a fluorescent screen on which pictures appear. The recreated image is reflected onto a mirror under the lid because at present it is impracticable to build a receiver with a direct-view screen.

Electrons move at such inconceivable velocity that, in describing the complex synchronization of the television system, we may think of seconds as weeks because so many fractional divisions are necessary. The camera electrons and the home receiver electrons move in a sort of "lockstep," and if one group lags behind the other by only one-millionth of a second, the final picture may look fuzzy or distorted.

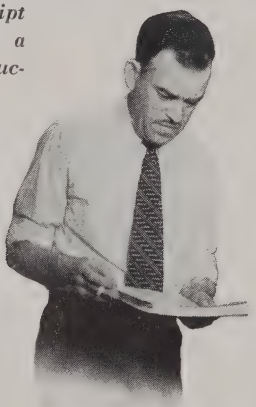
In the Viewing Room your Guide pointed to the Control Room, where adjustments are made for keeping the picture quality constant.

From the Control Room you passed into the Television Studio, similar in many respects to the studio used by NBC for experimental television broadcasting. The camera is focused on an illuminated scene. A microphone attached to a "boom" is suspended above the camera's field of vision. Guests in the adjoining Viewing Room can see and hear those who stand before the camera.

Hearts, HEADS, Hands



Writing the script —first step in a television production.



The director—he supervises all program production.

The men whose hearts, heads, and hands strive to build an American television industry may be grouped into three departments based on their respective functions, to wit:

1. Programming
2. Engineering
3. Economics

The program staff creates the form and substance of television entertainment. All the color and pageantry of modern life, from a football game to the inauguration of a president, from a telescopic view of the moon to a microscopic view of microbes, will eventually appear upon the television screen.

Nourished by hard toil, a new stagecraft evolves into an art based upon pre-existing arts, but differing from them all in presenting a wondrous imagery that conserves time and compresses space within the orbits of your eyes.

Had he lived to witness television, Shakespeare might have said, "All the universe is a stage . . ." From the bowels of the earth and the depths of the sea to the far, far dominions of cosmic space there exist no boundaries for human sight. Television program men hope to bring this universe of life and substance, of fate and circumstance, before your eyes. What things to see! What riddles to solve!

Camera operator's view of Gertrude Lawrence as she enacted a scene from SUSAN AND GOD *in the NBC Television Studio. The operator's "cue sheet" is seen attached to the camera.*

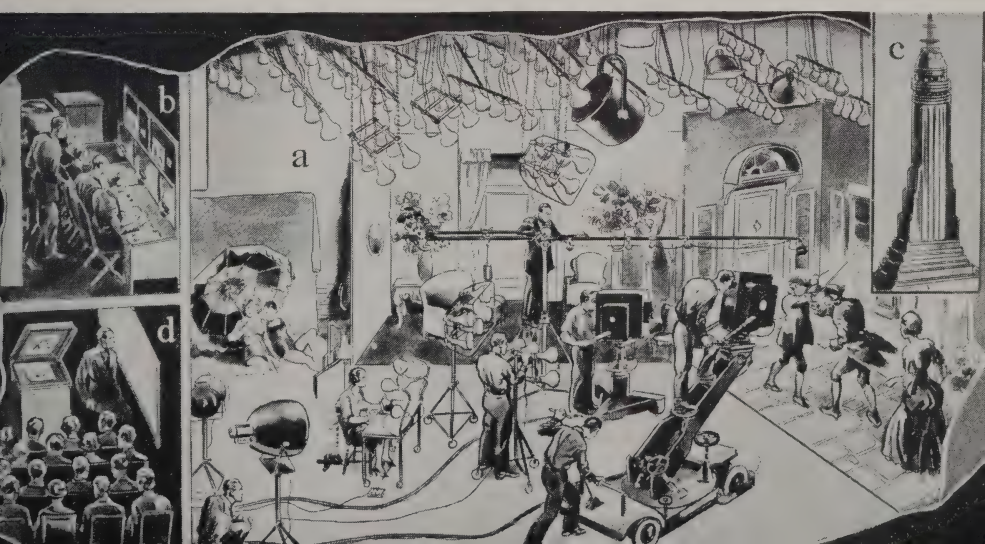
PROGRAMMING

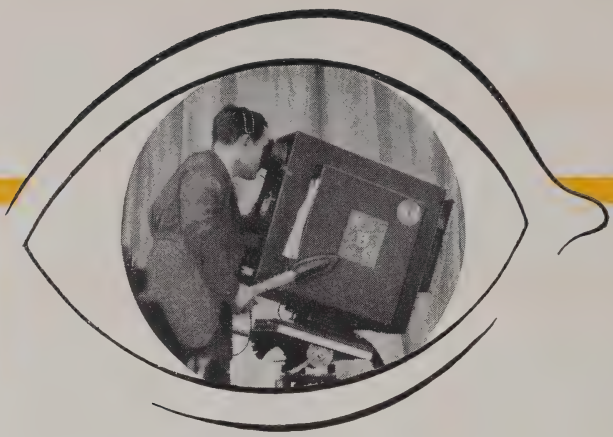
But before they embark upon such quests, they must familiarize themselves with numberless details about this difficult technique of broadcasting animated pictures. Right now they work with simple program material — one-act plays, travelogues, newsreels, vaudeville, demonstrations of science, etc. But each day they extend their horizons and draw plans to embrace new activities.

The chief aims of programming at present are to discover or create material suited to television, and to learn the best ways of presenting this material before a television audience. Thus they come face to face with the grim realities of producing programs that are entertaining and stimulating, but also different from the usual fare of sound radio, the stage, and the movies. To find the right solutions they need time.

As with the theatre and the movies, most programs begin with a writer whose job is to conceive plays and special features, invent plots, draw characters, plan action, or write

SEEN BEHIND THE SCENES OF TELEVISION AT NBC—*In the four main phases of television shown you see: (a) The studio in the RCA Building where actors and technicians work under studio lights (b) The master control room where engineers and directors monitor the sight and sound pickups, whence the electronic impulses speed by cable to the Empire State transmitter (c) Antenna atop the Empire State Building which broadcasts television programs over a 50-mile radius (d) Combination receiver which reproduces sight and sound transmitted by video and audio carrier waves.*





dialogue. His is the creative force, the chief inspiration and mainspring of human action.

Upon completion, the writer's script goes to the production director who confers with his colleagues on the problem of translating the cold words on paper into living human activity. On the basis of their discussions, assignments are made.

A director is named to supervise production. His responsibility extends to a thousand and one details, but he must not overlook that all his activity is a means to an end — to provide provocative entertainment or graphic information for the televiewer.

In the case of a studio production, the director hands a copy of the script to the scenic artist who conceives a logical setting for the action. He sketches a studio set in miniature and, following approval by the director, executes his designs.

Artists arrive for conferences, auditions, and tryouts. Exercising his judgment of their qualifications and of the specific requirements, the director chooses a cast.

If special sight or sound effects are necessary, they are either built to order or selected from a warehouse collection. Costumes and props may have to be rented.

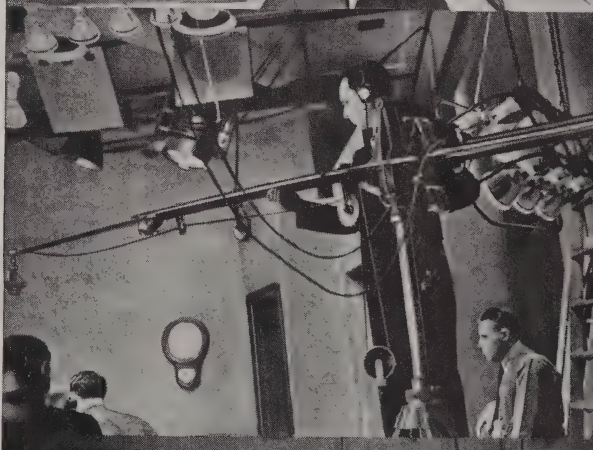
A young visitor to NBC inspects a miniature house built as a studio "sight effect." This house appears to be full size when seen on a television screen.

Television scenic artist working on full-size studio set, using a small-scale sketch as his guide.

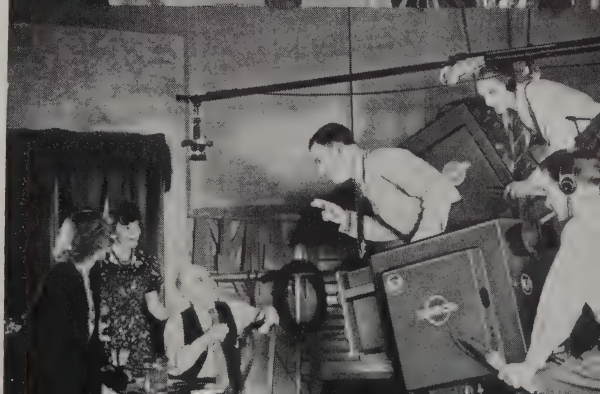
Artists designing and decorating titles for a television studio production. These titles announce the name of the program, the names of the cast, etc.

Television scenic artist preparing a small-scale model of a studio set. After the model is approved, it is built full-size.

The microphone boom operator. He follows the actors closely but keeps his microphone out of the cameras' field of vision. By turning a crank, he moves the microphone back and forth.



Interlude in a studio rehearsal. The director has called a halt to give a few pointers to his cast.

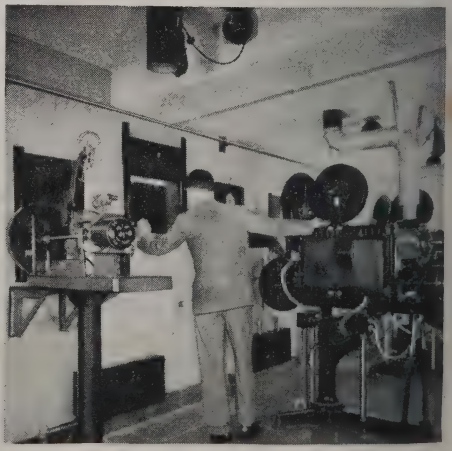


ENGINEERING

Television engineering embraces a wide assortment of indoor and outdoor activities. While the program personnel is responsible for creating a picture that can be televised, the engineering personnel is responsible for operating the cameras which convert the picture into a suitable "signal"; also for controlling and transmitting that "signal" to a radio transmitter, which impresses it on a carrier wave that radiates into space.

After studio rehearsals are scheduled, the director of technical production is called in. He coördinates the activities of camera operators, microphone boom operators, sound

Constructing a miniature model of a seaport town, complete in all details. This appears to be full-size when televised.



Projection room in NBC's Radio City plant, from which moving pictures are projected through the television system.

and video engineers, and the lighting technician, in coöperation with the program director.

At present NBC employs several studio cameras, each "shooting" the action from a different angle. Camera operators are skilled in "framing" and focusing pictures and quick to respond to a director's orders and suggestions.

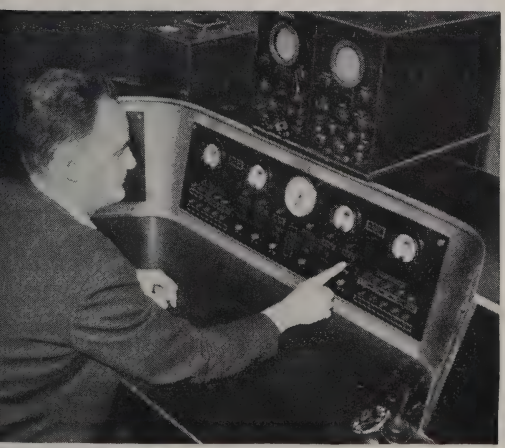
The lighting technician is more than an ordinary stage electrician, for he must not only visualize the color values in corresponding shades of gray, but he must also know how to "paint" a picture in interesting lights and shadows.

The man at the "boom" is charged with picking up both voices and incidental sound effects in a program. He must, of course, keep his microphone clear of the cameras' field of vision and at the same time he must keep it near the actors.

He moves his microphone backwards and forward by means of a crank, and swings it from side to side on a swivel.

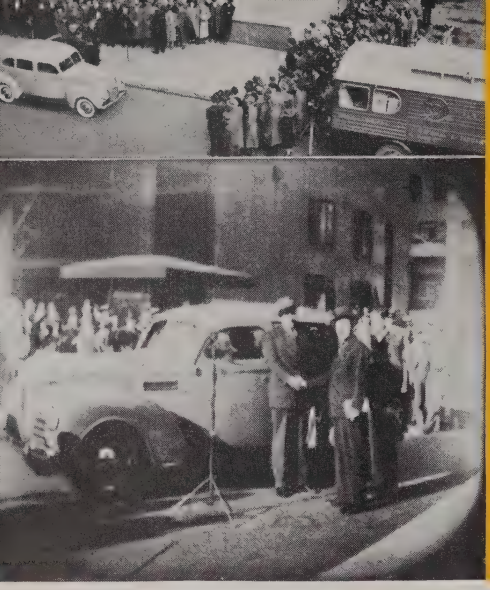
The sound accompaniment of a television program is monitored and relayed with auxiliary facilities, and subsequently broadcast on a separate radio channel.

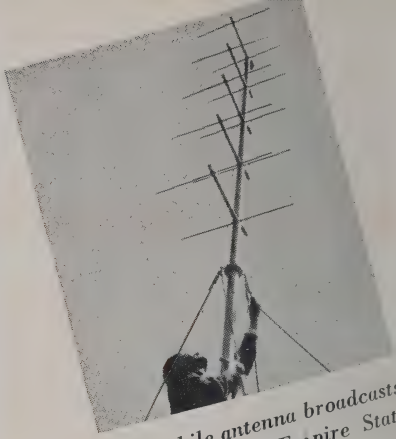
To control the intricate apparatus



Master control board of NBC's television transmitter station, located on the 85th floor of the Empire State Building.

Inside the television studio control room, where engineers and production director "monitor" a program.





Telemobile antenna broadcasts field pickup to Empire State transmitter for re-broadcast.

(Above) *A television broadcast of 1939 automobile models featuring the opening of the New York Automobile Show.* (Below) *Television image picture of auto company officials and one of the new models paraded before the camera.*

that makes sight broadcasting possible, it is necessary to place engineers at strategic points along the route of a television signal between the camera and transmitter.

In the master control room overlooking the studio, members of a "jury" manipulate ingenious devices which enable them to control the quality of the sight and sound transmitted by the system. Side by side sit the video control engineer, sound control engineer, and the engineer responsible for switching from one camera to another.

After a television program is "monitored," it goes from the RCA building via coaxial cable or "link" radio transmitter to the Empire State Building where sight and sound transmitters are located on the 85th floor. Here the sight "signal" is amplified and conditioned for broadcasting on a carrier wave to televiewers in the New York metropolitan area.

Besides these indoor activities, a squad of engineers is at present experimenting with a Telemobile Unit — a complete sight and sound broadcasting station on wheels — for outdoor program pickups.

Supporting all this activity is a group of research men assigned to a wide assortment of technical problems that bear directly on television progress.

The immediate promise of television broadcasting is for metropolitan communities, because it is both uneconomical and impracticable at present to make sight broadcasting as general as sound broadcasting. Hence, the possibility of a television network as extensive as present-day sound networks is remote. The limited coverage of a single television transmitter and the high cost of transmitting programs from city to city preclude any mushroom

TELEVISION GOES OUTDOORS

The first telemobile unit in America, built by the RCA Laboratories for the use of NBC. (Above) *Engineers inside the telemobile unit monitoring a field pickup.*

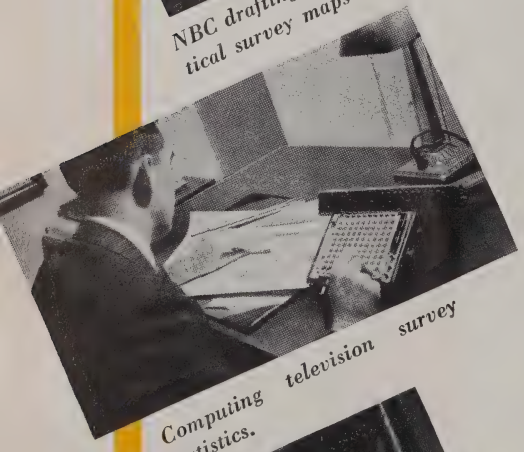
growth for coast-to-coast networks. Regional networks, uniting a group of favorably-located cities, appear more feasible and may materialize within several years. The possible methods of accomplishing this are by the use of coaxial cables or micro-wave radio relays.

Transmitters in one hundred of America's largest cities could reach about half the nation's people. Therefore, it seems that for many years the less-populous areas of the United States must depend solely upon sound broadcasts for radio entertainment.

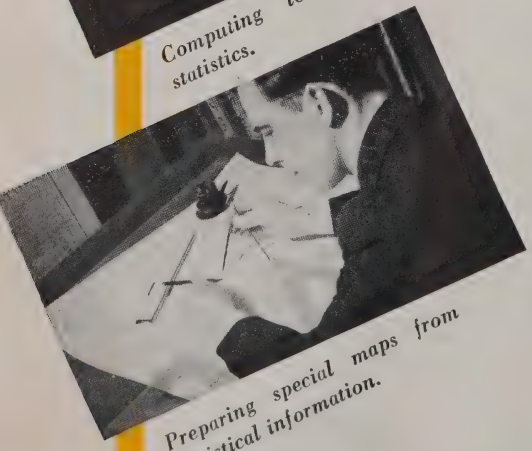
Much remains to be done and no one can predict when the goal of television will be reached, but the experience gained from operating the system experimentally rather definitely points the way toward a high-definition daily broadcast service.

ECONOMICS

NBC drafting room where statistical survey maps are prepared.



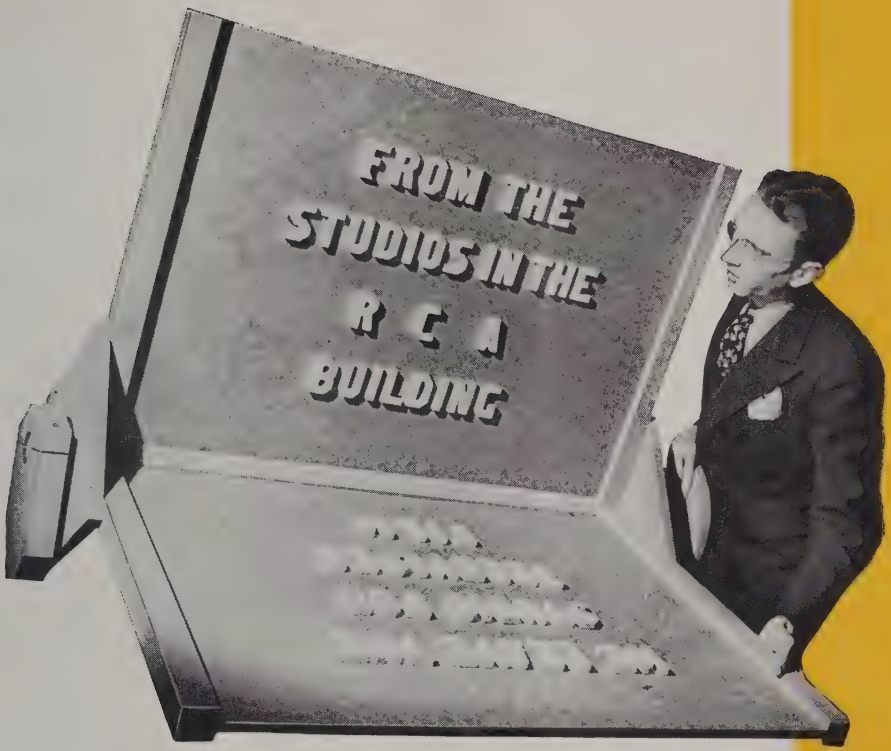
Computing television survey statistics.



Preparing special maps from statistical information.

Television broadcasting has never earned for itself one cent of revenue, either in this country or abroad, but those who have faith in the medium hope that a way may be found to balance the industry's broadcasting economics. No one expects that television will yield a profit from commercial broadcasting for years to come. It is a gradual development requiring wide support from other industries before it can stand on its own feet.

Preliminary to balancing television's economics, it is necessary to carry on surveys alluding to population distribution, geographical markets, network areas, local coverage, etc., involving the preparation of maps, charts, and tables of figures. Special interviewers, statisticians, and mathematicians handle this work. Their aim is to establish an economic stability that will pave the way for a daily broadcasting service with programs of artistic merit.



Title "windmill" to facilitate insertion of captions into a television program.

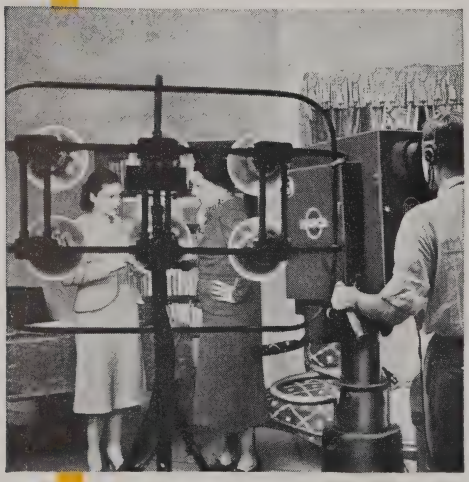
Televising a dramatic scene on a set depicting a prison warden's office.

A woodland scene as it was televised in NBC's Studio 3H.

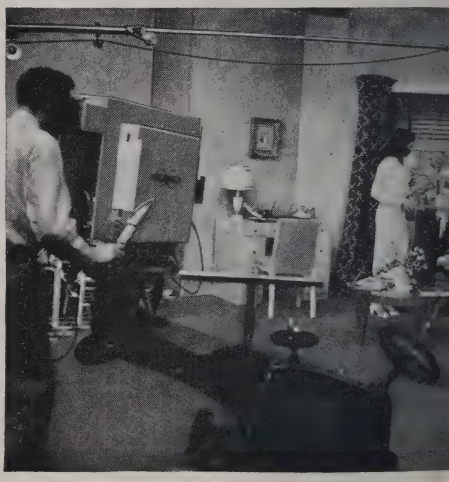
Performances by instrumental soloists make interesting television program material.

Scene from "Nine Loves of Emily," a one-act play, as enacted before NBC's television cameras.

Television actresses seen through frame of studio lighting fixtures.



A scene from "Good Medicine," comedy-drama adapted to television.



Doane Powell, maskmaker, wearing one of his creations. The famous laugh and the cigar are characteristic of the man who made the brown derby famous.

Two accomplished fencers demonstrate their ability with the foils in a television "short."

London's Thames Embankment is portrayed in a studio set used for the comedy blackout, "Sleeping Out."

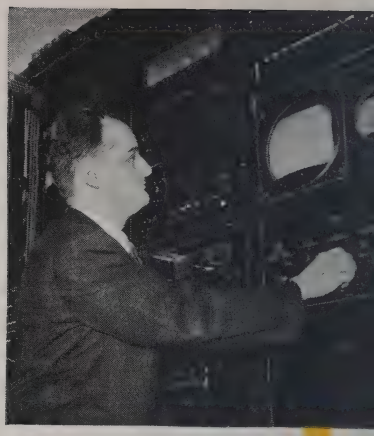
Studio 3H was converted into a "night club" for a variety program.

A tense moment in the performance of a television playlet, "The Ace Is Trumped."

A melodramatic scene from NBC's television adaptation of Sir Arthur Conan Doyle's story, "The Three Garridebs." Sherlock Holmes, the master sleuth, (right) gets his man after making some clever deductions.

from STUDIO to HOME

In tracing the route of a television signal from studio to home, this schematic arrangement of photographs illustrates the strategic points in broadcasting a sight-and-sound program. From studio to transmitter, all these points are connected by a coaxial cable, indicated here by wide yellow lines.



Section of transmitter control board in the Empire State Building.

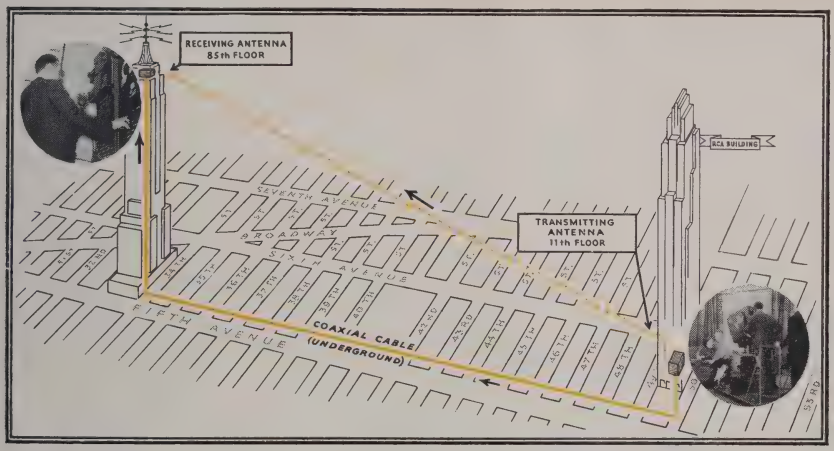
Studio control room.

Shooting a scene in a comedy-drama in NBC's Television Studio 3H.

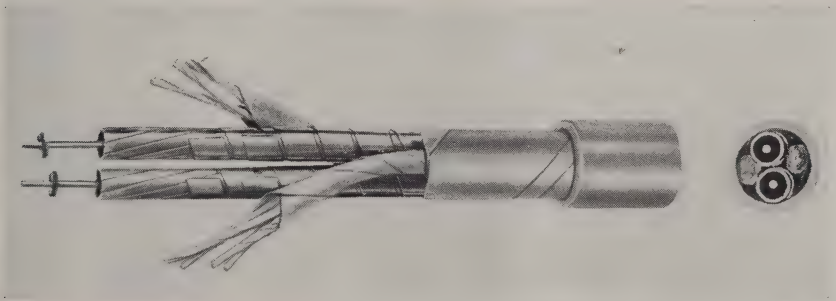
COAXIAL CABLE

Sight and sound antennae atop Empire State Tower.

In this living room scene, observers are gathered around a home receiver to see and hear the broadcast.



Sketch indicating how NBC television signals travel from RCA Building Studio 3H (right) to the Empire State Building transmitter (left). The solid yellow line represents a coaxial cable. Television picture signals may also be sent from studio to transmitter by radio waves, indicated by the broken yellow line.



Photograph showing interior construction of coaxial cable used in television line transmission. Cross-section on right shows arrangement of essential parts. (Courtesy Bell Telephone Laboratories.)

AS FAR AS YOUR EYES CAN SEE

The dependable coverage of the television transmitter atop the Empire State Building is shown on this map of the New York metropolitan area. Points outside a radius of 50 miles receive the broadcasts irregularly, depending upon a variety of factors.

This sketch illustrates roughly how the altitude of a transmitting antenna determines the area served by a television broadcast. The point where the dotted line touches the earth is the horizon, the theoretical limit of dependable coverage. Roughly, the range of the antenna, 1300 feet above Fifth Avenue, is about as far as your eyes can see from that elevation. (The vertical scale of this sketch is greatly exaggerated.)

THE QUESTION IS

The ten questions listed here are asked most frequently by visitors to NBC's Radio City studios.

Question 1: When will the first scheduled television broadcasting service begin in New York?

ANSWER: NBC plans to inaugurate a regular service in connection with the opening of the New York World's Fair, in the Spring of 1939. By that time a limited number of receivers will be in the hands of the public.

Question 2: How much will a television receiver cost?

ANSWER: It appears that the price will be above that of sound radios, but the prospective purchaser should remember that he is buying both sound and sight receivers in one cabinet. Depending upon the size of the image and numerous other factors, the price of home receivers will probably range between $100 and $1000.

Question 3: How far can television programs be broadcast?

ANSWER: At present NBC's experimental programs, broadcast from the Empire State tower, are received dependably within a radius of 50 miles. The coverage of this single transmitter is approximately 8000 square miles.

Question 4: Do you have television in colors?

ANSWER: Not yet. However, inventors in various parts of the world are working on color television and its related problems.

Elaine Kent, NBC actress, demonstrates history and art of television makeup.

At left, Miss Kent appears in ordinary street makeup . . . Lower left, she appears in makeup used in television circa 1930. Face makeup is white greasepaint; lips are black, and eyes heavily shaded. This striking makeup was necessary because the camera's sensitivity was rather poor . . . Lower right, she appears in today's panchromatic television makeup. Lips are Indian red-brown; complexion ranges from burnt orange to peach-tan, eyes outlined in brown. Television panchromatic makeup is similar to movie makeup.

Question 5: What kind of make-up do you use in television?

ANSWER: Makeup has changed constantly since the inception of television. About 1930 television actors painted their faces white and their lips black, but the present-day makeup is very similar to that used in the movies.

Question 6: What will be television's effect on motion pictures?

ANSWER: Certain types of motion pictures will fill an important function in television programs; and this should expand, rather than limit, the film market. Partly because people enjoy the mass psychology of a theater audience, and partly because the broadcasting of full-length features is limited, television offers little competition to the cinema.

Question 7: Is England ahead of the United States in television development?

ANSWER: At present, a single British station covers all of Greater London. Technically, America's standing in television development equals that of any other nation; in fact television in other countries utilizes the principles and inventions developed in RCA Laboratories. Abroad, it is customary to levy taxes upon radio audiences, which eliminates the sponsorship that supports radio in America.

Question 8: Why are such bright lights necessary?

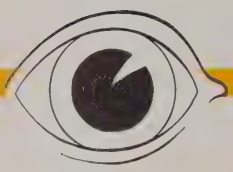
ANSWER: Because the television camera is not yet as sensitive to light and shade as our eyes. The intensity of illumination is slightly in excess of that used in motion picture studios, but research now under way points to a considerable reduction in the amount of illumination needed for studio operations.

Question 9: Will television ruin the legitimate theater?

ANSWER: Indications are to the contrary. Television will certainly borrow acting talent from the legitimate theater, and the appearance of these entertainers over television should also promote their stage popularity.

Question 10: Who invented television?

ANSWER: There is no single inventor of television, which has been a dream of many people for more than half a century. The most successful early experimenters include Paul Nipkow, who invented the scanning disc in 1884, and Boris Rosing, active with cathode rays in 1911. Marconi's radio experiments in the early 1900's were also vital. Zworykin, Baird, Farnsworth and a score of other experimenters have all contributed to the present status of television.



EVENTS PAST but

Significant Dates from Television's Diary

1817 — Baron Jöns Jacob Berzelius discovered selenium.

1873 — Light-sensitive properties of selenium, discovered by a telegraph operator named May, indicated that light values could be converted into equivalent electrical values.

1878 — Sir William Crookes invented the Crookes tube, and demonstrated cathode rays.

1883 — Edison discovered the "Edison effect." An electric current was made to pass through space from a burning filament to an adjacent metallic plate.

1884 — Paul Nipkow patented the television scanning disc.

1888 — Photoelectric cells were built and demonstrated.

1906 — Lee de Forest invented the three-element vacuum tube with a filament, plate, and grid.

1923 — Vladimir K. Zworykin (at that time with Westinghouse; since 1929 with RCA) filed patent application on the first form of modern television camera tube, the "Iconoscope," in wide use today.

1925 — C. F. Jenkins in Washington, D. C., demonstrated apparatus which showed far-off, moving objects, or "shadowgraphs."

1926 — J. L. Baird, in England, demonstrated television transmission of half-tone pictures.

1927 — Television transmission over wire circuit between New York and Washington demonstrated by Bell Telephone Laboratories.

1928 — First television drama, "The Queen's Messenger," broadcast from WGY's studios, Schenectady, New York.

1929 — Vladimir K. Zworykin, of RCA, demonstrated a non-mechanical receiver using a special cathode ray tube called "Kinescope."

1930 — First showing of television in a theatre. The program was broadcast from the RCA experimental station, 411 Fifth Avenue, to RKO Proctor's Theatre, 58th Street, New York City.

REMEMBERED

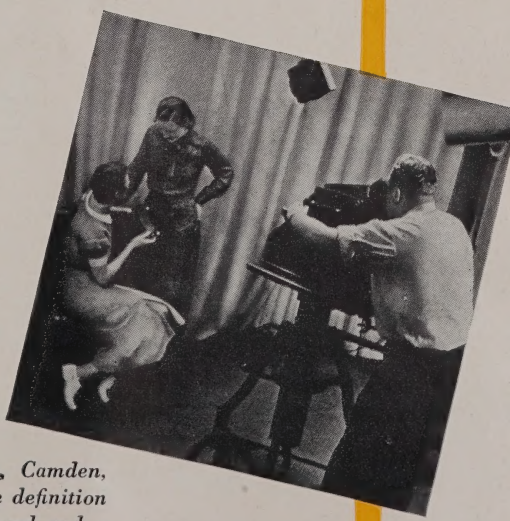
1931 — RCA installed experimental television facilities and studio in the Empire State Building tower, New York City, and commenced field tests in metropolitan area.

1935 — New type of wire line, the coaxial cable, capable of transmitting television signals, announced by Bell Telephone Laboratories.

1936 — June 29th, RCA all-electronic television field tests began, with broadcasts of 343-line pictures, from Empire State Building tower.

1938 — September 15th, NBC conducted first television sidewalk interviews with passers-by in Rockefeller Plaza, New York City. Transmission picked up by NBC-RCA telemobile unit, relayed to Empire State Building and then broadcast to the metropolitan area.

1939 — January 27th, RCA and NBC gave first demonstration of all-electronic television before Federal officials and press in Washington.



Experimenting in the RCA Laboratories, Camden, N. J., in 1934. Such tests resulted in picture definition of 343 lines, a frame speed of 30 per second and a greatly improved synchronizing device.

The television receiver assembly line at the RCA Manufacturin
Company in Camden, N. J. On a moving belt at left are Kinescope

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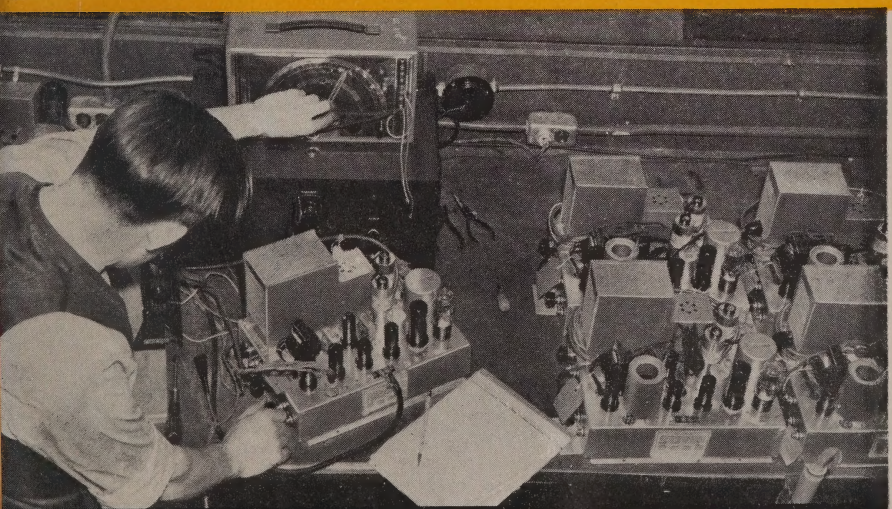
Just as the NBC Television Tour takes you behind the scenes of television—the NBC Broadcasting Studio Tour gives you a backstage view of sound broadcasting. You see how weird sound effects are created, how scores of stations from coast to coast are hooked up with split second accuracy, how studios go on and off the air—and scores of other fascinating operations . . . The NBC Broadcasting Studio Tour is conducted through the National Broadcasting Company Studios in Radio City, New York—and, on the Pacific Coast, in NBC's new Hollywood Studios, the Radio City of the West.



ne of the many exhaustive tests given R C A television receivers fter they come off the assembly line at the Camden plant.

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TELEVISION